REMARKS

STATUS OF THE CLAIMS

Claims 1-27 have been pending.

Claims 21-27 are rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite.

Claims 1-2, 9-11, 18-20 and 27 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Applicants Admitted Prior Art, hereinafter referred to as "AAPA," in view of Coates et al., U.S. Patent No. 6,694,389, hereinafter referred to as "Coates."

Claims 3-8, 12-17 and 21-26 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over AAPA, in view of Coates, in further view of Mizuno, U.S. Patent No. 6,922,743, hereinafter referred to as "Mizuno."

In accordance with the foregoing, the claims are amended and new claim 28 is added, and, thus, claims 1-28 remain for reconsideration, which is respectfully requested.

No new matter has been added.

The Examiner's rejections are respectfully traversed.

35 U.S.C. § 112, SECOND PARAGRAPH, REJECTION:

In the Office Action, at item 1, the Examiner asserts "Claims 21-27 recites the limitation 'wherein a use status' in each of the respective claims. There is insufficient antecedent basis for this limitation in the claim. As per claims 21-27, it appears unclear as to which 'use status' the applicant is referring to, as the claims 19-20, which claims 21-27 are depended upon directly or indirectly, does not appear to recite a claim limitation 'a use status'".

The Examiner points out that method claims 21-27 recite the limitation "wherein a use status" in each of the respective claims; however, there is no such description in the method claim 27. Accordingly, it is understood that only claims 21-26 stand rejected under 35 U.S.C. § 112, second paragraph.

In accordance with the foregoing, claims 21-26 are amended taking into consideration the Examiner's comments. Applicants respectfully submit that amended claims 21-26 comply with 35 U.S.C. § 112, second paragraph. Withdrawal of the claim rejection is respectfully requested.

35 U.S.C. § 103(a) REJECTIONS:

Independent claims 1, 10 and 19 are allegedly rejected over AAPA in view of Coates.

In particular, the Office Action at item 3, asserts that AAPA allegedly discusses a physical device and a storage control apparatus, the host interface module and the management module in the storage control apparatus, and a reconnection queue and a control means in the management module.

Further, in the Office Action at item 3, pages 5-6, the Examiner recognizes that AAPA does not discuss or suggest a monitoring and a switching by the management module; however, the Examiner further asserts "it would have been obvious to one of ordinary skill in this art, at the time of invention was made to include Coates' s buffer flow control into AAPA' s reconnection queue."

In AAPA, the prior art as described in the specification of the present application, discusses two kinds of systems (one path mode and scattering mode) exist as DPR (Dynamic Path Reconnection), however, as described, usually, only one of the systems is adopted. In contrast, for example, claim 1 recited, in part, "controlling means ... **for controlling resumption of said I/O process in either a first system.... or a second system**" as recited in claim 1. Further, the claimed embodiment as shown in Fig. 2, provides a reconnection queue, a monitoring, a controlling and a switching.

The Examiner, at page 3, lines 15-16, seemingly acknowledges that a cache memory used by the claimed management module corresponds to the claimed reconnection queue; however, Applicants disagree with the Examiner's interpretation. The cache memory, as described for example, in the application Specification at page 2, lines 20-26 and Fig. 1 (3oa), temporarily stores data to be written to each disk unit from a host, or data to be read to the host from each disk unit; thus, the cache memory is different from the claimed reconnection queue which queues "information on one or more input/output requests to be reconnected among input/output requests from said channels of said host as control blocks, and managing said enqueued control blocks" as recited, for example, in claim 1, or in other words, the reconnection queue queues a control block to manage.

Further, the Examiner asserts at page 4, line 4 to page 5, line 3 of the Office Action that the claimed "**a controlling means**, when an I/O process corresponding to one of said one or more control blocks managed in said reconnection queue is resumed, **for controlling resumption of said I/O process in either a first system ...or a second system**...", as recited

in claim 1 is allegedly also described in the application Specification at page 7, lines 5-16, and page 7, lines 17-26, respectively. However, the AAPA only discusses a first system (one path mode) and a second system (scattering mode). In other words, the AAPA does not disclose or suggest a "controlling means ... **for controlling resumption of said I/O process in either a first system.... or a second system**," because the AAPA only discusses the systems. Therefore a prima facie case of obviousness can not be based upon the AAPA because the AAPA fails to disclose or suggest "controlling means ... for controlling resumption of said I/O process in either a first system.... or a second system" because the AAPA only discusses each system.

The Office Action, at page 5, lines 11-21, asserts that Coates discloses the "monitoring means for monitoring the number of said enqueued control blocks in said reconnection queue" as recited, for example, in claim1.

Coates relates to data transmission, particularly Coates relates to a method and apparatus for analyzing a data flow through one or more buffer. According to the Abstract of Coates, lines 2-10 recites, in part:

> One embodiment detects input congestion and output starvation in a plurality of sub-buffers of a ripple FIFO buffer ... to draw conclusions about the occupancy of the ripple FIFO buffer under steady state condition. One embodiment detects input congestion and output starvation at every sub-buffers of the ripple FIFO buffer. Other embodiments detect input congestion and output starvation at a subset of the sub-buffers of the ripple FIFO buffer.

The Examiner asserts that Coates, column 11 lines 21-32, column 3 lines 36-50 and Fig. 5 (symbols 500, 520, 530, and 540) discloses "monitoring means for monitoring the number of said enqueued control blocks in said reconnection queue." Applicants respectfully disagree with the Examiner's assertion.

First, Coates, column 11, lines 21-32, discusses:

> In one embodiment of the present invention, the approximate occupancy of the ripple FIFO buffer is calculated by counting the number of sub-buffers reporting a steady congestion state. In another embodiment of the present invention, the approximate occupancy of the ripple FIFO buffer is calculated by counting the number of sub-buffers reporting a steady starvation state. In another embodiment of the present invention, the approximate occupancy of the ripple FIFO buffer is calculated from the number of sub-buffers reporting a steady starvation state and the number of sub-buffers reporting a steady congestion state.

Further, Coates, column 3, lines 36-50 including description of Fig. 5, discusses:

> Fig. 5 illustrates the operation of one embodiment of a flow controller. At step 500, it is determined whether the fullness of the buffer is above an upper threshold. If the fullness is not above an upper threshold, the process moves to step 530. If the fullness is above an upper threshold, at step 510, the buffer signals the data producer to decrease its transfer rate. At step 520, the buffer signals the data receiver to increase its transfer rate and the process moves to step 530. At step 530, it is determined whether the fullness of the buffer is below a lower threshold. If the fullness is not below a lower threshold, the process moves to step 500. If the fullness is below a threshold, at step 540, the buffer signals the data receiver to decrease its transfer rate. At step 550, the buffer signals the data producer to increase its transfer rate and the process moves to step 500.

In the technique disclosed in this Coates, in order to perform the data transmission to the data receiver from the data producer while avoiding occurrence of overflow or underflow in the ripple FIFO buffer, transfer rate of the data producer (data writing speed for the ripple FIFO buffer) or transfer rate of the data receiver (data read speed from the ripple FIFO buffer) is adjusted in accordance with state of the ripple FIFO buffer. That is, in order to keep the state of the ripple FIFO buffer between lower threshold and upper threshold, speed adjustment of the data producer and the data receiver in front and near of the ripple FIFO buffer is performed.

In contrast, the claimed embodiment comprises "a switching means for dynamically switching the system to be executed by said controlling means to either said first system or said second system according to the number of the enqueued control blocks monitored by said monitoring means" as recited, for example, in claim 1.

Coates keeps a state of the queue constant, and for its maintenance, writing speed to the queue or read speed from the queue is adjusted. In contrast, the claimed embodiments are not limited to increasing an amount of control blocks when the number queuing in the reconnection queue is small, and also decreasing an amount of control blocks when the number queuing in the reconnection queue is large. Conversely, in Coates, state of the queue (ripple FIFO buffer) is kept constant. Therefore a prima facie case of obviousness cannot be based on AAPA and Coates, because the Examiner has failed to show some objective teaching in the prior art (i.e., documentary evidence) or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine or modify the relevant teachings of the references, because there is no technical idea in Coates that the reconnection system is switched in accordance with state of the queue according to the claimed embodiment.

Therefore, a prima facie case of obviousness cannot be based on AAPA and Coates because simply combining AAPA and Coates, which performs speed adjustment of the data producer and the data receiver at front and rear of the ripple FIFO buffer in order to keep state of the ripple FIFO buffer constant as described above, fails to teach or suggest the claimed feature of "a switching means for dynamically switching the system to be executed by said controlling means to either said first system or said second system according to the number of the enqueued control blocks monitored by said monitoring means" as recited, for example, in claim 1.

Independent claims 10 and 19 patentably distinguish over the cited prior art for similar reasons as independent claim 1.

New claim 28 patentably distinguishes over the cited prior art for similar reasons as independent claim 1. In contrast to AAPA and Coates, the claim 28 embodiment provides:

> An apparatus controlling an access from a host to a physical device, the apparatus comprising:
>
> a host interface in communication with said host through a plurality of paths belonging to a same path group; and
>
> a controller,
>
> enqueuing information on one or more input/output reconnection requests from among input/output requests from the host as control blocks,
>
> monitoring a number of said enqueued control blocks in said reconnection queue,
>
> when an I/O process corresponding to one of said one or more control blocks in said reconnection queue is resumed, **controlling resumption of said I/O process in either a first system** of issuing a reconnection request to each of said paths belonging to the same path group one by one through said host interface and requesting said host interface to perform said I/O process using a path first successful in reconnection, **or a second system** of issuing concurrently or almost concurrently the reconnection request to said plural paths belonging to the same path group through said host interface and requesting said host interface to perform said I/O process using a path first successful in reconnection, and
>
> **dynamically switching between said first or said second reconnection system according to the number of the enqueued control blocks.**

Dependent claims recite patentably distinguishing features of their own or are at least patentably distinguishing due to their dependence from the independent claims. Withdrawal of the rejection of pending claims, and allowance of pending claims is respectfully requested.

Claim 2, for example, recites:

> when the number of the enqueued control blocks monitored by said monitoring means is not larger than a predetermined number, said switching means switches the system to be executed by said controlling means to said first system, and when the number of the enqueued control blocks monitored by said monitoring means exceeds said predetermined number, said switching means switches the system to be executed by said controlling means to said second system.

In one claimed embodiment, and in contrast to Coates, the state of the reconnection queue (the number of queuing) is monitored, and the controlling "switches the system to be executed" based upon the monitoring, by restarting input/output processing corresponding to control block managed by the reconnection queue. One benefit of the embodiment is that the start of new input/output processing is prevented in such a way that delay of input/output processing (sinking) is prevented by eliminating immediately a stand-by state when the number of input/output requests of reconnection waiting is large and when the number of input/output request of reconnection waiting is small, by suppressing unnecessary increase of busy rate of the path.

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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